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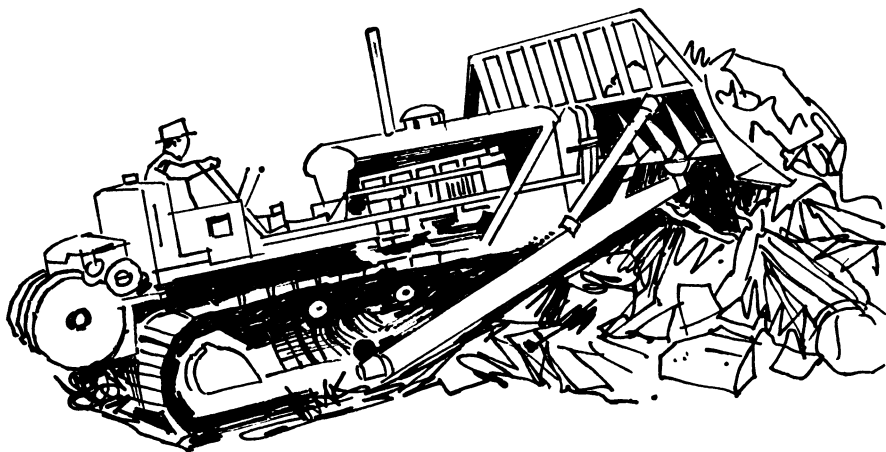
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Equipment for clearing brush from land



Farmers' Bulletin No. 2180

U.S. DEPARTMENT OF AGRICULTURE

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Brush and Stumps."

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EQUIPMENT FOR CLEARING BRUSH FROM LAND

A major consideration in any brush-clearing operation is selection of proper equipment. To be efficient, equipment must be suited to the job.

This bulletin describes some common types of equipment used to clear brush—small, medium, or large—from areas of various sizes.

SMALL BRUSH

Small brush is woody growth having stems that do not exceed 2 inches in diameter. Equipment and methods used to clear small brush depend on the size of the area—small, medium, or large.

Small Areas

Handtools or wheel-mounted circular saws are adequate for small jobs. The common method of removal is to cut, pile, and burn brush.

Axes.—Single- or double-bitted axes can be used to cut top growth. They can also be used as an aid in grubbing roots. Axes must be kept properly sharpened. When using an ax, never chop into the ground. Make sure no branches interfere with your swing.

Machetes.—Machetes can be used to cut stems or branches. They can be sharpened with a whetstone.

Brush hooks.—Brush hooks are useful in cutting the stems of growth. The brush hook is swung like a scythe. It is sharpened by grinding with an abrasive wheel.

Grub hoes and mattocks.—These tools can be used to chop off brush near ground level or to dig out small taproots.

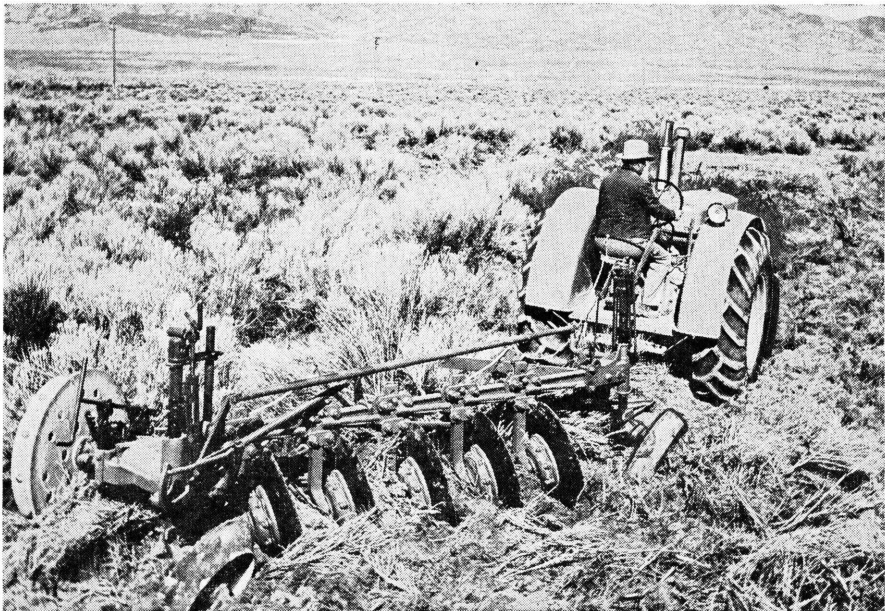
Wheel-mounted circular saws.—These saws are fast and effective in cutting top growth. Their use is not recommended on steep slopes.

Medium Areas

Where size of the area rules out efficient use of handtools or wheel-mounted circular saws, wheel tractors and auxiliary attachments can be used to cut and pile brush, shred it, or plow it under.

Moldboard plows.—Tractor-drawn or tractor-mounted moldboard plows can be used to turn and cover small brush if the soil is not excessively hard, sticky, or rocky.

Plows with heavy-duty frames are recommended for brush with thick stems. Plows with light frames should be used only on the smallest sprout- and seedling-type growth to avoid damage to the plow frame.



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Figure 1.—Disk plows can be used to plow down small brush or to plow under large brush that has been mowed or shredded.

For easier plowing, adjust the plow hitch for plowing below root crowns. Keep plowshares sharpened.

Remove jointers and colters; they are of little use in plowing brush and they may become damaged.

Covering wires are helpful in guiding trash under the turning furrow slice.

Moldboard plows also can be used to plow under mowed or shredded brush.

After an area has been worked by moldboard plows, it should be sown to a forage crop that will not require plowing for 3 years. If this is done, the woody material will rot and be less of a problem in the second plowing.

Disk plows.—Tractor - drawn standard or vertical disk plows can

be used to plow down standing small brush (fig. 1) or to plow under small brush that has been mowed or shredded.

Disk plows do not do as thorough a job of covering brush as moldboard plows, but they can be used on soil that is dry, hard, sticky, or rocky; moldboard plows cannot.

Rotary mowers.—Tractor rotary mowers, similar to rotary lawn-mowers, will cut and shred brush up to 4 inches in stem diameter (fig. 2). Their use is not recommended for hilly or rocky land.

Flail-type rotary cutters.—These tractor-drawn machines have cutting knives that rotate around a horizontal shaft to knock down and shred small brush. They are available in a wide range of sizes as power-takeoff units. The small size

can be used with a wheel tractor. Larger sizes must be used with crawler tractors.

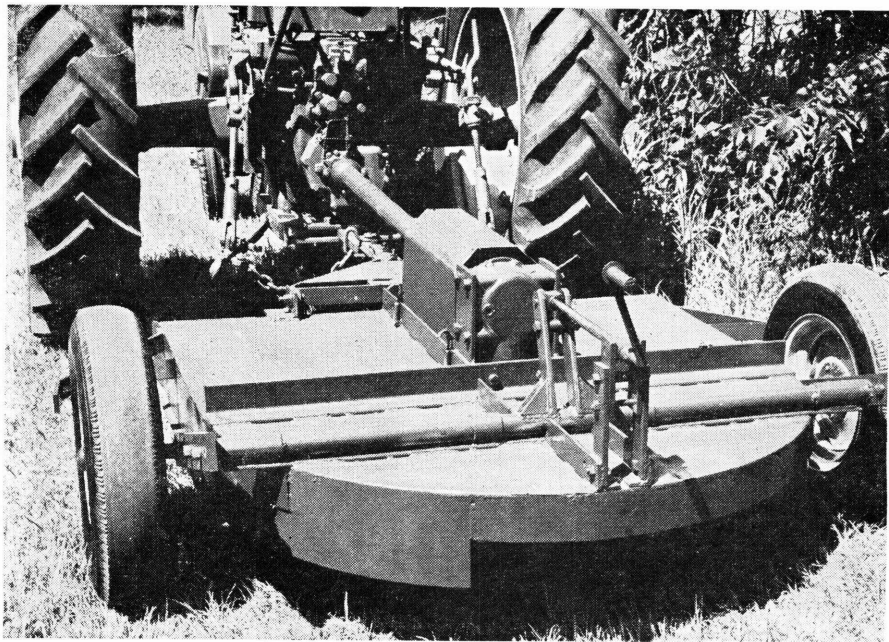
Some farmers use the chopper unit from flail-type forage harvesters as a substitute for the regular flail-type rotary cutter; only a few modifications are necessary (see fig. 3).

Sickle mowers.—Regular farm-tractor mowers can be adapted for cutting small brush by substituting a shorter cutter bar, stub guards, and heavier sections. Ground speed is not as fast for this type of mower as for rotary mowers, but an experienced operator can keep a sickle mower in continuous operation through fairly dense growths of brush with stems ranging up to 1½ inches in diameter. To cut stems

larger than 1½ inches in diameter, you must stop the tractor with the cutter bar pressing against the brush and allow the sickle to hit the stems several times. Cut brush can be left on the ground to rot, raked up and burned, or turned under with a plow.

Rolling brush cutters.—Wheel-tractor-towed rolling brush cutters will knock down small brush, chop it into small pieces, and work part of the chopped material into the soil. The residue can be left on the ground to rot or it can be raked, piled, and burned.

Sweep rakes.—Tractor-mounted sweep rakes can be used to rake felled brush into piles for burning. They are used as followup equipment to mowers and beaters.



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Figure 2.—Rotary mowers are useful in cutting brush up to 4 inches in stem diameter on level, rock-free land.



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Figure 3.—Forage harvester adapted for cutting light brush. The cover of the cutting unit has been removed. The chopped material drops on the ground instead of going into the blower and spout.

Large Areas

Figure 4 shows some crawler-tractor attachments used to clear small brush from large areas. Custom operators are usually hired to furnish and operate this equipment.

MEDIUM BRUSH

Medium bush is woody growth most of whose stems range from 2 to 8 inches in diameter. Equipment used to remove medium brush depends on the size of the area to be cleared.

Small Areas

Hand tools—Axes, crosscut saws, and power chain saws (fig. 5)—or tractor-mounted circular saws can

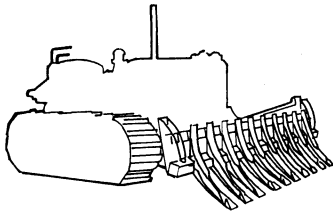
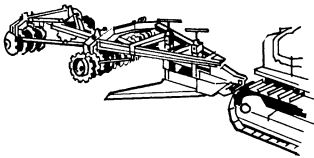
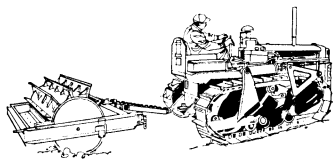
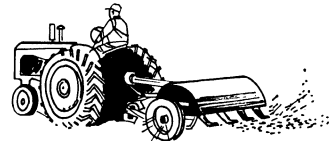

be used to cut top growth to ground level. Stumps may be left to rot or may be pulled out.

If you pull out stumps with a tractor, hook the pull line to the tractor's drawbar; otherwise you may damage your tractor or even cause it to rear over backward. Protect tractor operator and bystanders from dangerous backlash in case the pull line breaks.

Medium Areas

You can clear medium brush from medium areas with heavy-duty power chain saws, with tractor-mounted circular saws, or with crawler tractors and their specialized attachments.

Figure 4.—Some attachments used with crawler tractors to clear small brush from large areas.

Attachment	Features	Use
 Root Rake	Curved teeth that travel above or below the ground surface	Uprooting small brush. Raking and piling cut brush
 Undercutter With Disk	V-plane slices through ground at any set depth ranging from 2 to 8 inches. Disk chops up growth	Uprooting growth up to 6 inches in stem diameter
 Rolling Brush Cutter	Rolling drum with cutting blades. (Style of blades differs on some models)	Knocking down and chopping dense brush up to 5 inches in stem diameter
 Rotary Flail-type Cutter	Cutting blades attached to revolving horizontal shaft by hinges or free-swinging chains. The shaft is driven by power takeoff from tractor	Knocking down, crushing, and shredding bushy type growth
 Anchor Chains or Steel Cables	Anchor chain or steel cable towed by two tractors	Knocking down and uprooting growth. Two passes must be made: the first bends the brush, the second uproots it. Incomplete job often results but usually adequate for range clearing. Best with brittle or dead brush. Area must be free of obstructions such as rocks and large trees

PLAY IT SAFE!

Land clearing is a hazardous job. Help prevent accidents by keeping your equipment in good repair and by using it properly.

Heavy duty power chain saws.—These saws can be used to fell top growth on land that is to be used for pasture. Brush should be cut off as near to the ground as possible so the area can later be mowed.

Power chain saws can also be used to cut fallen brush into sizes easy to move to the burning pile.

Wheel-tractor-mounted circular saws.—These saws are used similarly to heavy-duty power chain saws. They are not efficient on hilly land.

Wood chippers.—Portable wood chippers can be used for disposing of the brush. They consist essentially of a chipping head and power plant, mounted on a tractor, truck, or trailer. They may be driven by power take-off, or have a separate engine. Brush up to 4 inches in diameter and beyond can be chipped,

depending on the size of the cutting head and the power available. Ordinarily in land clearing, the chips or shreds are allowed to fall back on the ground and are not burned.

Possible advantages of chipping are:

1. Chipping provides a method of disposal that is not based on the use of fire.

2. Chipping will result in lower fire hazards through reduction of flammability and rate of spread.

3. Chipping can be done at any season of the year.

4. Chips are readily incorporated into organic soil and may retard erosion when spread on exposed areas.


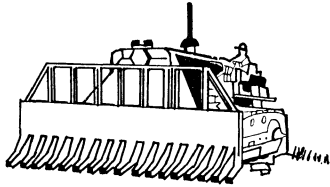
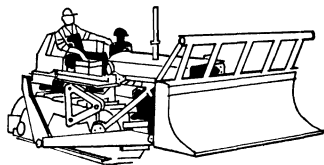
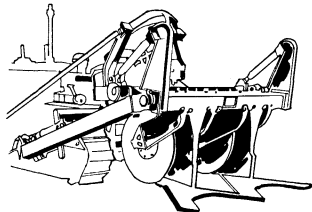

Crawler tractors and attachments.—Many variations of crawler-tractor attachments are available



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Figure 5.—Chain saws are effective in felling medium or large brush and in cutting downed material into small pieces for easy handling.

Figure 6.—Some attachments used with crawler tractors to clear medium brush from medium or large areas.

Attachment	Features	Use
 Bulldozer Blade	Straight bulldozer blade that can be raised or lowered. Adjustments also permit tilting of blade. Carries some soil to brush pile	Shearing brush at ground level. By raising blade, larger stems can be uprooted. Can also be used to shear off stems slightly below ground. Used also for piling. Most satisfactory on hard ground and where roots remaining in ground will not interfere later
 Land-Clearing Blade	Modified version of bulldozer blade. Has teeth on bottom-blade edge. Does not carry as much soil to the brush pile as regular bulldozer blade	Knocking over and piling brush. Can also be used to uproot small growth. Better for light or soft ground, and where some root removal is desired
 Tree Cutter	Tension bar and blade. Tension bar bends tree, sharp steel blade slices through tree at ground level	Cutting trees at ground level. Other equipment must be used to pile the brush
 Root Cutting Blades	Rear-mounted V-plane cutters. Front-mounted bulldozer blade blazes path for root cutters	Cutting roots of dense underbrush. Usually must be followed by root rake or land-clearing blade. Often used where crop or range reseeding follows
 Anchor Chains or Steel Cables	Anchor chain or steel cable pulled by two tractors. Usually weighted	Knocking down and uprooting brush. Two passes are necessary: the first bends the brush, the second uproots it. Incomplete job often results but usually adequate for range clearing. Best with brittle or dead brush. Areas must be free of obstructions such as rocks and large trees

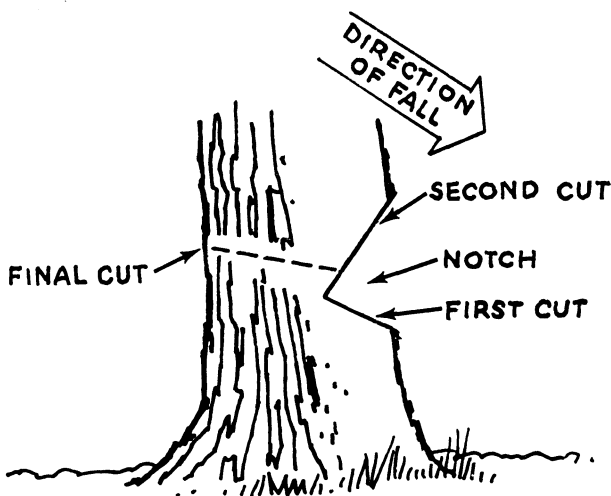


Figure 7.—Method of cutting tree to control direction of fall.

for brush clearing. Some types can be used to shear off brush at ground level and then to pile brush for burning. Other types can be used to uproot brush and push it to the burning pile. This type of equipment is usually furnished and operated by custom operators. The best equipment to use often depends upon local factors, such as type and size of brush, soil conditions, and what the ground will be used for afterward. Consult with your county agent and local custom operators for recommendations.

Figure 6 describes some of this equipment.

Large Areas

To clear large areas of medium brush, use the same type of crawler tractors and attachments recommended for medium areas.

LARGE BRUSH

Large brush is woody growth having a high percentage of full-grown trees, 8 inches in diameter

or larger. Equipment and methods used to clear large brush vary with size of the area to be cleared.

Small Areas

Hand tools—axes, crosscut saws, and power chain saws—can be used to fell a few trees. The most efficient tool for this purpose is the heavy-duty power chain saw. It can be used to fell trees and to cut fallen trees into small sections for easy removal.

In felling trees, plan your cuts so falling trees will not become entangled in branches of nearby trees (see fig. 7).

If it is desirable to remove a few stumps, you can burn them or pull them out with a tractor.

Medium and Large Areas

Large brush is usually found on deep soils or bottom lands. Hence, large brush is usually cleared from medium or large areas to convert the land to crop use.

Figure 8 describes some common types of land-clearing attachments used with the heavier types of crawler tractors to clear large brush. Custom operators are usually hired to furnish and operate this equipment.

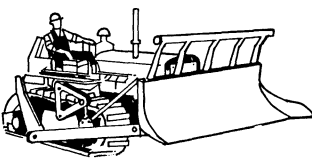
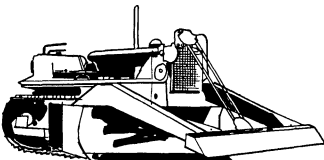
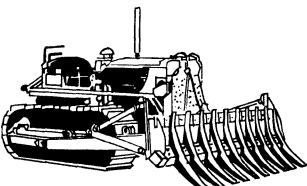
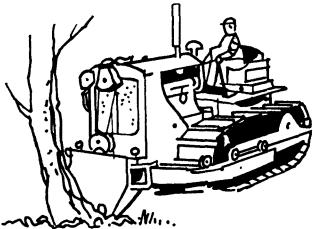
The brush pile should be burned while the clearing operation is in progress. This will save considerable reworking of the burning pile.

BRUSH BURNING

Usefulness of fire for removing brush varies with (1) species of brush, (2) site, (3) topography, (4) density of the brush cover, and (5) risk of the fire escaping.

Federal and State laws, and county and city ordinances often require that a burning permit be obtained prior to burning. Construction of

Figure 8.—Some attachments used with crawler tractors to clear large brush from large areas.

Attachment	Features	Use
 <p>Stinger Blade</p>	Has protruding point (stinger) on blade. Stinger splits large trees into sections for easier shearing or uprooting	Shearing or uprooting trees and brush of all sizes. Piling material for burning
 <p>Treedozer</p>	Independently operated knockdown beam: V-shaped cutting blade. Knockdown beam starts tree over, exposes root system. V-shaped plow rips into roots and tears them free from ground	Uprooting trees. Auxiliary equipment: brush rakes, root rakes
 <p>Heavy-duty Brush Rake, or Rock Rake, or Root Rake</p>	Curved teeth with heavy-duty caps. Unit can be raised or lowered	Uprooting small trees. Pushing and piling felled material. Removing rocks
 <p>Tree Stumper</p>	Detachable stumper blade. Force of tractor is concentrated on short blade	Uprooting stumps

firelines in advance of burning and having available men and equipment to set and control the brush fire are usual requirements of burning permits. Liability is generally with the landowner or lessee. Ask the advice of local agricultural authorities such as the county agricultural agent, forest ranger, or soil conservation service technician before using fire.

BURNING STUMPS

Burning is an easy way to remove a few stumps when tractor power is not available. A homemade stove or Stumpfyre,¹ a chemical mixture, may be used.

The stove is better for dead

¹ Mention of a trade name in this publication does not constitute a guaranty or warranty of the product named and does not signify that this product is approved to the exclusion of other comparable products. The name is used solely for the purpose of providing specific information.

stumps. To make a stove, remove top and bottom from a 5-gallon paint can or a 55-gallon oil drum; choice between a can or a drum depends on the size of the stump. Punch several 1-inch holes near the bottom of the can or drum to provide a draft. Place stove over stump and build a fire in it. Start fire with kindling wood and then add charcoal, coke, or coal to get a hot fire.

Stumpfyre will burn green or dead stumps. It is applied to a stump in spring and allowed to diffuse through the wood for 2 or 3 months before the stump is fired. For more information on use of Stumpfyre, write to the Department of Forestry, College of Agriculture, University of Illinois, Urbana, Ill.

Never burn stumps within 10 feet of a building or near flammable material. In some States, it is necessary to get a burning permit from local authorities.

● CHEMICAL CONTROL OF BRUSH

Herbicides, applied with ground or aerial equipment, are recommended for killing brush where it is not necessary to remove the brush immediately. Their use is particularly suited to land that is to be used for rough pasture.

Herbicides are also recommended for controlling regrowth when the tops of brush are removed mechanically or by burning.

For information on methods of applying herbicides, see your county agricultural agent or write to the U.S. Department of Agriculture, Washington 25, D.C.

● EROSION CONTROL

Brush-clearing changes the character of the land. This often causes serious erosion problems. For information on principles of soil and water conservation, consult technicians of the Soil Conservation Service.